Underpricing in Turkey: A Comparison of the IPO Methods

Guray Kucukkocaoglu

Baskent University, Faculty of Economics and Administrative Sciences
Baglica Kampusu, Ankara, 06530, Turkey
E-mail: gurayk@baskent.edu.tr
Tel: + 90 (312) 234 10 10/1728

Abstract

This paper addresses the question of what kind of selling and underwriting procedure might be preferred for controlling the amount and volatility of underpricing in the Istanbul Stock Exchange (ISE). Using 1993-2005 firm and issue data, we compare the three substantially different IPO methods available in the ISE. One is very similar to the *book building mechanism* used in the U.S., another is the *fixed price offer*, and the third one is the *sale through the stock exchange* method. The empirical analysis reveals significant first day underpricing of 7.01% in fixed price offer, 11.47% in book building mechanism, and 15.68% in sale through the stock exchange method. Finally, we also show that fixed price offers can better control the impact of market information on underpricing than sale through the stock exchange method.

Keywords: IPOs, underpricing, fixed price offers, book building, sale through the stock
exchange
Jel Classification Codes: G10, G30

1. Introduction

Extensive amount of research from a variety of different markets have documented the presence of first-day underpricing upon the listing of initial public offerings. The evidence is well documented by Loughran, Ritter, and Rydqvist (1994) and Ritter [1] (1998), (2003) in many developed and emerging markets. In developed markets, in the absence of restrictions on intra-day price movements, first-day underpricing is observed in broad price bands. However, in emerging markets, in the presence of daily volatility limits, first-day underpricing is observed in narrow price bands. In contrast to the daily price limits, significant positive short run returns are observed in a number of emerging markets and substantial amount of money is "left on the table" by issuers.

Besides empirical evidence, most of the theoretical models explaining IPO underpricing are grouped under four broad headings by Ljungqvist (2005), these are (i) information asymmetry between the investors, the issuing firm and the underwriter, these models assume that one of these parties knows more than the others, (ii) institutional reasons, institutional theories focus on three features of the marketplace: litigation, banks' price stabilizing activities once trading starts, and taxes, (iii) control considerations, control theories argue that underpricing helps shape the shareholder base so as to reduce intervention by outside investors once the company is public, (iv) behavioral approaches, behavioral theories assume either the presence of 'irrational' investors who bid up the price of IPO

---

[1]   Ritter (1998), (2003) provides an update on the compilation of Loughran, Ritter, and Rydqvist (1994).

shares beyond true value, or that issuers suffer from behavioral biases causing them to put insufficient pressure on the underwriting banks to have underpricing reduced. These theoretical models almost always end with the conclusion that the average IPO is undervalued at the offer price, where the initial investors, in most cases, benefit from possessing information by receiving allocations of shares in IPOs and earn the largest first-day returns.

The expectations of issuing firms, investors and underwriters in IPO pricing are considerably different. In an offering, the issuer generally wants to receive the highest possible price to maximize cash flows to the firm. Investors like to purchase shares at a deep discount so that they can realize positive returns in a short investment period. Underwriters, acting as an intermediary between investors and issuing firms, suffer from a dilemma, if an underwriter determines IPO prices too low, where the foreseen amount of money left on the table will be huge, the issuing firm may withdraw or switch to another underwriter. On the other hand, if an underwriter determines IPO prices relatively high, investors will hesitate to buy new issues, which would result in low commissions and an unwanted effort in aftermarket stabilization activities. Underwriters, however, have an incentive to underprice the shares to ensure that they can sell the offering, and, unsurprisingly, there is extensive evidence that IPOs are, on average, underpriced. Hence, pricing of stocks in IPOs may be the most critical stage of the IPO process. More recently, the literature on IPOs, both theoretical and empirical, focuses on the efficiency mechanisms of the following methods for pricing initial public offerings. At the center of this literature, book building, auctions and fixed price offers differ mainly in price-discovery and share allocation process.

  (i)   Book Building - in which the underwriters do road shows and take non-binding orders from investors before setting the issue price.
 (ii)   Auctions - in which the company sets a price range to be used as a non-restrictive guideline for investors, than accepts bids, each specifying a number of shares and a price the investor is willing to pay for them, finally, the market-clearing price set by the investors approximates the real price the shares will command in the market.
(iii)   Fixed Price Offer - in which the issue price is set first and than orders are taken from investors who typically pay in advance for part or all of the shares that are ordered.
 (iv)   Sale through the Stock Exchange - in which the sale is initially conducted in the primary market of the stock exchange by a designated underwriter. Those investors who buy the shares in the primary market must wait until the shares trade in the secondary market in order to sell their shares. The price designated at the time of registration with the securities exchange commissions is set as the opening price.
  (v)   Hybrid Offerings - in which the underwriters combine the preceding IPO methods, and design auction/fixed price, auction/book building and book building/fixed price hybrids. For most hybrids, the most common combination is the book building/fixed price offer, where the underwriter uses the book building method to set the price and allocate shares to institutional and foreign investors, and retain the fixed price offer to the domestic retail investors who do not participate in the price-setting process.

This paper addresses the question of what kind of selling and underwriting procedure might be preferred for controlling the amount and volatility of underpricing in the Istanbul Stock Exchange (ISE). In this regard, we first compare the three IPO methods available in Turkey. One is very similar to the *book building mechanism* used in the U.S., another is the *fixed price offer*, and the third one is the *sale through the stock exchange* method. Then, we estimate a binary probit on the issuer's choice between fixed price offer and sale through the stock exchange method, however, because of the declining importance of the book building mechanism in Turkey, we excluded the book build IPO sample from our binary probit estimations. Finally, we determine the factors that are expected to have an effect on the IPO returns. Our results indicate that, the comparison of the two mechanisms yield that for certain values, namely *first day underpricing, IPO amount and fractions of equity sold*, fixed price offer outperforms the sale through the stock exchange method. To the best of our knowledge, this is the first empirical study on the comparison between fixed price offer and sale through the stock exchange

method in the IPO literature. The uniqueness of the data and the availability of the sale through the stock exchange method in the ISE make it possible to conduct a study on the comparison between these two methods.

The remaining part of this paper is organized in six sections. In the next section, we provide a comparison of the theoretical and empirical research conducted on IPO methods across many countries around the world. In section 3, we describe the three important Turkish IPO market selling procedures. In section 4, we describe the data and the methodology we used in our empirical tests. Section 5 documents the relationship between market conditions and underpricing of IPOs in different time series and the last section concludes.

2. Comparison of the IPO Methods in the Literature: Theory and Evidence

The efficiency of the IPO methods has been the subject of an academic research over a decade, both empirical studies and theoretical models have tried to explain the advantages of one method over another. The argument that is often made in favor of IPO methods is often empirical as well as theoretical. Researchers studying on the efficiency of the IPO methods try to answer the most challenging question, "Which one of the IPO mechanism is the most efficient?", interms of controlling the amount and volatility of underpricing, share allocation and pricing. However, according to our comprehensive literature research, both empirical studies and theoretical models listed in Table 1 have some mixed answers.

Table 1:   Comparison of the IPO methods in the literature: Empirical Studies and Theoretical Models.

	Empirical Studies and Theoretical Models presenting some evidence on the efficiency of		
	Book Building	**Fixed Price Offer**	**Auctions**
	Over	**Over**	**Over**
Benveniste and Spindt, (1988), (1989)	Fixed Price Offer		
Spatt and Srivastava, (1991)	Fixed Price Offer		
Loughran, Ritter and Rydqvist, (1994)	Fixed Price Offer		
Chowdhry and Sherman, (1996)	Fixed Price Offer		
Benveniste and Busaba, (1997)	Fixed Price Offer		
Ritter, (1998)	Fixed Price Offer		Book Building and Fixed Price Offer
Sherman, (2000), (2002)	Fixed Price Offer and Auctions		
Ljungqvist, Jenkinson and Wilhelm, (2000)	Fixed Price Offer		
Aorsio, Giudici and Paleari, (2000)	Fixed Price Offer		
Guidici and Paleari, (2001)	Fixed Price Offer		
Biais and Faugeron-Crouzet, (2002)	Fixed Price Offer		Fixed Price Offer
Chahine, (2002)	Fixed Price Offer and Auctions		
Pandey, (2004)	Fixed Price Offer		
Kutsuna and Smith, (2004)	Auctions		
Anand, (2005)	Auctions		
Jagannathan and Sherman (2005)	Auctions		
Busaba and Cheng, (2002)		Book Building	
Bierbaum and Grimm, (2003)		Auctions	
Chemmanur and Liu, (2003)		Auctions	
Hsu and Hung, (2005)		Auctions	
Leleux and Paliard, (1995)			Fixed Price Offer
Beierlein, (2000)			Book Building
Bennouri and Falconieri, (2001)			Book Building
Draho, (2001)			Book Building
McDonald, (2001)			Book Building
Biais, Bossaert and Rochet, (2002)			Book Building and Fixed Price Offer
Kaneko and Pettway, (2003)			Book Building
Derrien and Womack, (2003)			Book Building
Vandemaele, (2003)			Fixed Price Offer

Comparison of the IPO methods in the literature goes back to Benveniste and Spindt[2] (1988), (1989) and Spatt and Srivastava (1991), they suggest that the American bookbuilding procedure is efficient since it encourages investors to reveal their beliefs about the issue's value at a cost of initial underpricing. Book building allows investors to collect information about the value of the stock and price the issue more accurately. To compensate the investors who reveal information, underwriter will favor them when allocating shares. However, fixed price mechanism does not utilize any information about realized buyer valuations in setting the issue price and is generally inefficient.

Loughran, Ritter and Rydqvist (1994) present the first international evidence on the short-run and long-run performance of companies going public in many stock markets around the world. They document that the fixed price method is associated with greater underpricing because of the greater probability of the issue failing and the increased uncertainty associated with the longer time delay between offer and issuance time.

Sherman (2000), (2002) shows that fixed price offer, can lead to higher underpricing than book building. Contrary to the fixed price offer and the auction method, in book building underwriters discriminate investors in the allocation of shares to establish long-run relationship with intermediaries. Book building gives the underwriter greater flexibility in designing a solution that reflects the individual issuer's preferences. By controlling investor access to IPO shares, book building controls both the winner's curse problem that affects discriminatory auctions and the free rider problem that affects uniform price auctions. Book building also reduces uncertainty for both issuers and investors. In a study that covers 47 countries, Sherman (2002) has found that in all countries in which the bookbuilding mechanism has been introduced, pre-existing auction systems have decreased in popularity or disappeared altogether.

Ljungqvist, Jenkinson and Wilhelm (2000) use a unique dataset containing information on 2,051 initial public offerings in 61 stock markets around the world, during the period of 1992-1999. The authors examine the relative direct and indirect costs of offerings carried out by book building and fixed-price methods. They find that, the direct costs of book building are typically twice as large as direct costs for fixed-price offers. Compared to fixed price offerings, book building efforts – though more expensive – produce far less underpricing. Nevertheless, fixed price offering is still an extremely common method that is not likely to be abandoned by the underwriters completely. Compared to book building efforts, fixed price offering is an efficient, low cost way to distribute shares to retail investors, avoiding the high fixed costs of road shows.

Biais and Faugeron-Crouzet (2002) analyze and compare the performance of book building, fixed price offering, uniform price auction, internet-based Open IPO mechanism, and an auction like mechanism called the Mise en Vente in France. Conclusions emerging from their analysis are; Fixed price offerings lead to inefficient pricing and winner's curse. Dutch auctions can also lead to inefficiencies, to the extent that they are conductive to tacit collusions by investors. The book building and an auction like mechanism Mise en Vente can lead to optimal information elicitation and price discovery.

Derrien and Womack (2003), use the French IPO data for the 1992-1998 period and compare the three underwriting/selling mechanisms available on the French market. One is very similar to the book building mechanism used in the United States. Another is a fixed price procedure. The third one is an auction-like procedure. Authors show that the auction procedure is better than the others at controlling underpricing in general as well as the variance of underpricing of the issued shares in "hot" versus "cold" markets. Fixed price offering method is indeed inefficient and leads to greater underpricing compared to IPOs sold through book-building and auctions. However, the main empirical comparison in this paper is between the two main procedures auction and book building. Authors find evidence that during hot markets auctioning is associated with less underpricing than book building.

---

[2] The literature on underpricing in initial public offerings goes back to Logue (1973), Ibbotson (1975), Chalk and Peavy (1987), Miller and Reilly (1987), Ritter (1984), Rock (1986), Allen and Faulhaber (1989), Benveniste and Spindt (1988, 1989), Grinblatt and Hwang (1989), and Welch (1989). However, the mechanism by which initial issues are sold has largely been ignored until Benveniste and Spindt (1988), (1989).

They attribute the result to the auction method's ability to incorporate more information about recent market performance into the offer price.

Bierbaum and Grimm (2003) compare the fixed price and the uniform auction in a game theoretic framework. The comparison of the two mechanisms yields that for certain parameter values, namely a low variance of the asset and, at the same time, a sufficiently high probability of low demand, fixed price method outperforms the auction in terms of revenue. Moreover, the revenue in the fixed price mechanism is typically less volatile than the revenue in the auction.

Chemmanur and Liu (2003) model the effect of costly information production on issuers' choice of a fixed-price offer or a uniform-price auction with exogenous entry of bidders. Their model predicts that IPO auctions will exhibit a significantly lower mean and variance of underpricing compared to fixed-price offerings. This is due to the fact that the offering price in an IPO auction aggregates the information produced by outsiders to a significant degree, so that this offering price is greater for higher intrinsic-value firms and lower for lower intrinsic-value firms in IPO auctions than in fixed-price offerings. At the same time, there is less information production in IPO auctions compared to fixed-price offerings where the offering price is set by insiders to induce the optimal degree of information production, so that a lower amount of information is reflected in the opening price of the shares listed in the stock market. Thus, Chemmanur and Liu (2003) demonstrated that, in many situations, firms will prefer to go public using fixed-price offerings rather than IPO auctions in equilibrium, since such offerings allow the firm to induce the optimal extent of information production.

Paney (2004) examines the initial returns, characteristics of issuers and long run performance of Indian IPOs on a sample of 84 Indian IPOs between 1999 and 2002. In terms of initial returns or underpricing, Paney (2004) finds that fixed price offering yields higher initial returns on average, as compared to book building. In terms of issuer characteristics, Paney (2004) finds that fixed price offering are used by issuers offering large proportion of their capital by raising a small amount of money. In contrast, book building is opted for by issuers, offering small portion of their stocks and mobilizing larger sums of money.

Hsu and Hung (2005) present an empirical study conducted on the Taiwanese companies between 1996 and 2000. Using a sample of 280 pure fixed-price offers and 84 hybrid auctioned, authors find that, Taiwanese hybrid auctions are associated with less under-pricing and with a lower variance of under-pricing than versus the pure fixed-price offers, but these differences are not statistically different. On the other hand, we find that the market index returns prior to the IPO pricing date have a strong influence on the under-pricing of Taiwanese IPO auctions and of the pure fixed-price offers. Authors provide empirical evidence of how Taiwanese issuers make the choice of IPO method. Taiwanese issuers that float large IPOs, or which have a pricing conflict with underwriters, will likely use a hybrid auction to distribute shares. On the other hand, when the relative risk level of IPO auctions to fixed-price offers has increased, the issuers will likely avoid an IPO auction. Empirical evidence also explains why Taiwanese IPO auctions have lost market share to fixed-price offers. Further results reveal that Taiwanese IPO auctions are not associated with less under-pricing and with a lower variance of under-pricing, nor are they better at incorporating recent market information into the IPO price than the pure fixed-price offers. Authors' examination on issuers' choice of hybrid auctions or fixed-price offers indicates that Taiwanese issuers condition their choice of IPO method not only on firm characteristics, but also on IPO size and on market conditions. This is why Taiwanese issuers prefer a pure fixed-price offer to a hybrid auction are based on market volatility and the pricing conflict. In doing so, under a volatile market where Taiwanese hybrid auctions have become much riskier relative to the pure fixed-price offers, issuers will prefer a pure fixed-price offer to a hybrid auction, resulting in a lower popularity of Taiwanese hybrid auctions.

As listed in Table 1, Fixed Price Offering seems to be the less favorable method comparing to Book building and Auction Methods. It is a fact that, the worldwide introduction of book building method during the 90's has promoted efficiency in the major equity markets. However, Sherman (2002) states that stock markets listing few IPOs each year, fixed price offering is still be the optimal method.

2.1. Research on IPOs in the Istanbul Stock Exchange (ISE)

Firms in Turkey may offer their shares to the public through, book building, fixed price offer and sale through the stock exchange method, however, they are mainly underwritten and sold using the fixed-price offering method; a method which is very common world wide is becoming much less common, particularly for more active markets. Recent empirical studies, focused mainly on the initial returns and under pricing, conducted by Ozer (1999), Kiymaz (2000) and Durukan (2002), show that underwriters of the Turkish companies listed in the Istanbul Stock Exchange do not fully incorporate all available information into the IPO offer price. The first day returns of IPOs average approximately 12.41%-13.10%-14.61% respectively, indicating that systematic underpricing largely observed in the ISE. Further, Ozer (1999) finds that IPOs provide significant excess returns in the first three days following the offer. Abnormal returns are the highest on the first day, decrease in the second and the third event days and approximate the market movement after the third day of trading. Kiymaz (2000) finds that these initial returns are related to the size of issuer, rising stock market between the date of public offering and first trading day, institutional ownership and self-issued offering. Durukan (2002) finds that these initial returns are related to the size of issuer, gross proceeds, age of firm, debt level in the firm capital structure in the year prior to IPO, institutional ownership and self-issued offering.

3. Methods of Sale in the Istanbul Stock Exchange (ISE)

The Turkish IPO market gives issuers and underwriters a choice of three different IPO selling mechanisms. Accordingly, firms may offer their shares to the public through one of the following three methods of sale.

3.1. Fixed-Price Offering

In a fixed price offering method, a fixed price at which the securities are offered is known in advance by the investors. Investors fill in and sign the bid forms and submit them to the underwriter during the period designated in the prospectus. When the bid forms are submitted, investors must deposit the amount corresponding to the demanded shares to the underwriters' account. At the end of the bid collection period, the allocation of shares among investors is conducted through the pro-rata basis. Where the total amount of shares offered to the public is divided by the number of investors until the entire amount of shares has been allocated.

After the bid collection process, the underwriter submits to the issuer a list of the allocation of shares among investors within two business days after the end of the bid collection period. The isuer then approves the allocation list and returns it to the underwriter within two business days. The lists of bids that are not met are announced by the underwriter and the corresponding amounts are returned immediately to investors. Also, the shares pertaining to bids that have been met are released to investors.

3.2. Book Building Method

In a book building method, price at which securities will be offered is not known in advance to the investor. Only an indicative price range is known and bids above this minimum price are collected. As in the fixed price method, investors submit the bid forms and deposit the corresponding amount to the underwriters' account. At the end of the bid collection period, the allocation of shares is conducted as follows. Starting from the highest-price bid, the bids are transformed into a table showing cumulative bid amounts at each price level. The price level at which the cumulative amount exceeds the amount of shares offered is set as the selling price. All bids above that price are met.

After the bid collection process, the underwriter submits to the issuer a list of the allocation of shares among investors within two business days after the end of the bid collection period. The issuer then approves the allocation list and returns it to the underwriter within two business days. The lists of

bids that are not met are announced by the underwriter and the corresponding amounts are returned immediately to investors. Also, the shares pertaining to bids that have been met are released to investors. Book building method in the ISE is more like a hybrid bookbuilding (auction-book build), where all retail investors are allowed to place orders in a public offer tranche, and all have an equal chance of getting shares. The prices, however, are set by the underwriter who is given incentives to attend the road show.

3.3. Sale through the Stock Exchange

The initial public offering of an issue using Sale through the Stock Exchange method can be carried out to the Istanbul Stock Exchange within the regulatory framework of the stock exchange after the approval of the Capital Markets Board of Turkey (CMBT). The sale is first conducted in the primary market of the ISE by a designated intermediary institution. Those investors who buy the shares in the primary market must wait until the shares trade in the secondary market in order to sell their shares. The sale can be made through the secondary market of the ISE after fulfilling all the required documentation at least 20 days prior to the offering. The price selected at the time of registration with the CMBT is set as the opening price. From then on, the price of the shares moves within the band determined by the daily limits (+/- 21 %) set by the ISE.

4. Data and Methodology
4.1. Data

The sample we analyze is the widest ever examined to carry out a research on IPOs in Turkey. We obtain firm data and issue data from the Istanbul Stock Exchange. Firm data includes book value of assets, book value of equity, book value of debt, sales revenue, net profit, firm age. Issue data include the offer data, number of shares issued, number of days between pricing and first trade, amount raised, offer price, first aftermarket price, and other offering details.

Our sample consists of 217 IPOs from January 1993 through October 2005. Panel A of Table 2 reports the number of IPOs and gross proceeds in Turkish market during this period. Of these 217 IPOs, 149 firms use fixed price offers (69%), 39 firms use Sale through the Stock Exchange (18%), 29 firms use book building (13%) to distribute their shares. The number of IPOs during this period peaked in 2000 than hit the bottom in 2001. As a consequence of the 2001 crisis[3], the number of IPOs between 2001-2003 totaled only 7. Nevertheless, the book building mechanism which was often used in mid 90's has lost issuers interest in the most recent years, there were 25 total book building offerings in 1994-1995, but there have only been 4 since the beginning of 1996[4]. Thus, our main comparisons in this paper are between the Fixed Price Offer and Sale through the Stock Exchange method.

Panel B of Table 2 reports some descriptive statistics of Turkish IPOs from 1993 through 2005 on firms specific and market related characteristics. In line with the evidence on initial returns documented by Ozer (1999), Kiymaz (2000) and Durukan (2002), IPOs in the sample also suffer from a significant underpricing on an average. The average initial returns computed on the basis of first trading day closing are positive and significant for all the three types of IPO methods, high levels of underpricing observed in sale through the stock exchange with a mean of 15.68%, low levels of underpricing observed in fixed price offers with a mean of 7.01%. The average initial returns computed on the basis of first month closing price are still positive for fixed price offers with a mean of 15.61% and sale through the stock exchange offers with a mean of 58.83%, however, book building offers lead their investors into a systematic under-performance at the same time period.

---

[3]   The Turkish economy has suffered from an acute liquidity crisis in 2001. The exchange rate as measured by Turkish Lira/USD depreciated by 50% in a short period of time.

[4]   Underwriters explain this disinterest as follows: Foreign investors are reluctant to participate in book building method, because they want to know the price in advance.

Table 2: Panel A – Initial Public Offerings Between 1993-2005

Distribution of IPOs						
Year	**Number of Companies**	**Fixed Price Offer**	**Sale through the Stock Exchange**	**Book Building**	**Nominal Value Thousand US$**	**Amount Sold Thousand US$**
1993	16	1	15	-	18.130	152.447
1994	25	5	2	18	24.419	270.480
1995	29	16	6	7	44.440	246.783
1996	27	24	3	-	34.626	167.922
1997	29	28	-	1	66.091	420.377
1998	20	19	1	-	66.998	383.348
1999	10	8	2	-	52.391	87.413
2000	35	34	1	-	157.690	2.809.532
2001	1	1	-	-	231	243
2002	4	3	1	-	17.062	56.467
2003	2	-	2	-	1.958	11.252
2004	12	9	2	1	107.114	482.575
2005	7	1	4	2	18.436	472.107
Total	**217**	**149**	**39**	**29**	**609.586**	**5.560.946**

Our sample consists of 217 IPOs from January 1993 through October 2005. Of these 217 IPOs, 149 firms use fixed price offers (69%), 39 firms use Sale through the Stock Exchange (18%), 29 firms use book building (13%) to distribute their shares.

Panel B also shows that the fractions of equity offered to the public is higher in the sale through the stock exchange method with a mean of 35.32%, than the fixed price offer (25.66%) and book building (24.28%) methods. Firm specific variables such as Net Sales, Total Assets, Total Equity, and Total Debt show that larger firms are more likely use the fixed price offers and smaller firms use sale through the stock exchange and book building methods.

4.2. Choice of IPO method

In this part of the study, we try to answer whether "issue related characteristics", "issuing firm characteristics" and "market related characteristics" have a stronger influence on issuers' choice of IPO method. As discussed and confirmed by Derrien and Womack (2003) in French IPOs, and Hsu and Hung (2005) in Taiwanese IPOs, previous market conditions prior to IPOs and some firm characteristics at the time of the IPO have significant impacts on the level and the variability of initial underpricing. To answer the same question in Turkish IPOs, we follow Hsu and Hung's (2005) methodology and first estimate a binary probit.

$$Y = X\beta + \varepsilon \tag{1}$$

where Y = 0 for the "sale through stock the exchange"

Y = 1 for the "fixed-price offer"

X is the matrix of explanatory variables

ε is a vector of mean zero independent and identically normally distributed residuals.

The coefficients measure the change in probability of adopting a fixed-price offer.

The univariate results in Panel B of Table 2 indicate that firms have chosen an IPO method in accordance with the "issue related and issuing firm characteristics". However, binary probit will help us relate issuers' choice of sale through the stock exchange or fixed-price offer to "issue related characteristics" and/or "issuing firm characteristics" and/or "market related characteristics".

We used various variables as indicators of different aspects of IPOs and grouped; *Source of Equity Sold, Fractions of Equity Sold, IPO Amount* and *Underwriting Arrangements*, under "issue related characteristics", and *Age of the Firm, Total Assets, Total Equity*, Total Debt, Net Sale and *Net Profit,* under "issuing firm characteristics", and *Daily Return, Adjusted Daily Return, Weekly Return, Adjusted Weekly Return, Monthly Return, Adjusted Monthly Return, Standard Deviation, Market Return and Market Volatility,* under "market related characteristics".

Table 2: Panel B - Descriptive statistics of Turkish IPOs from 1993 through 2005

IPO/Firm Characteristics

	Fixed Price Offer			Sale through the Stock Exchange			Book Building		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev	Mean	Median	Std. Dev
IPO Amount ($ Thousand)	$29,873.40	$8,121.48	$147,300.88	$6,593.29	$3,141.03	$6,848.51	$12,177.25	$10,969.42	$9,009.70
Fractions of Equity Sold	25.66%	20.00%	16.37%	35.32%	20.00%	30.98%	24.28%	16.67%	16.78%
Days between pricing and first trade	10.48	8.00	9.76	8.74	7.00	5.20	22.46	14.00	25.86
Net Sales ($ Thousand)	$105,314.90	$275,416.00	$35,601.75	$54,464.50	$28,194.80	$68,297.10	$49,556.20	$30,864.70	$55,182.60
Total Assets ($ Thousand)	$110,256.10	$29,454.50	$34,694.15	$50,311.60	$14,207.30	$72,297.20	$49,880.90	$31,384.80	$66,969.10
Total Debt ($ Thousand)	$88,106.70	$13,515.80	$33,991.03	$36,108.00	$13,219.30	$50,667.60	$40,494.80	$17,538.90	$65,113.30
Total Equity ($ Thousand)	$31,726.20	$13,642.70	$6,166.32	$19,845.50	$7,734.60	$37,226.10	$15,616.10	$12,119.90	$14,063.80
Net Profit ($ Thousand)	$4,598.90	$2,643.70	$2,515.26	$7,202.90	$3,414.40	$10,755.30	$5,642.70	$3,213.70	$6,262.10
Age of the Firm	17.19	12.84	17.42	17.11	17.32	15.45	19.36	16.70	12.16
1st Day Return (underpricing)	7.01%	7.67%	14.73%	15.68%	10.91%	18.75%	11.47%	6.67%	41.03%
1st Day Adjusted Return (underpricing)	7.47%	7.22%	14.86%	15.88%	12.15%	18.21%	11.85%	7.32%	41.34%
1st Week Return	9.59%	0.96%	31.77%	42.58%	25.94%	55.96%	17.37%	5.87%	59.67%
1st Week Adjusted Return	8.87%	1.32%	31.08%	40.47%	26.95%	57.06%	17.14%	3.27%	59.93%
1st Month Return	15.61%	-2.75%	62.31%	58.83%	36.36%	72.67%	-8.83%	-13.51%	56.02%
1st Month Adjusted Return	12.14%	-3.97%	59.79%	43.23%	36.20%	64.98%	-13.02%	-12.40%	54.69%
Market Return prior to IPO	6.65%	6.07%	11.05%	8.34%	7.09%	9.39%	6.49%	5.61%	7.66%
Market Volatility prior to IPO	15.40%	14.80%	4.77%	13.58%	13.93%	3.49%	15.64%	13.76%	6.24%

IPO Amount, is the gross proceeds from the IPO stated in USD. *Fractions of Equity Sold,* is the portions of shares offered to the public. *Days between pricing and first trade,* is the number of calendar days between the day when the offering price is chosen and the IPO date. *Net Sales, Total Assets, Total Debt, Total Equity, Net Profit* are from the book values of the firm in the year preceding of an IPO. *Age of the Firm,* is the age of the issuing firm at the time of the IPO. *1st Day Return, 1st Week Return, 1st Month Return* of the IPO is defined as the percentage change of the stock price from its offering price to the first trading day, first trading week and first trading month's closing price. *1st Day Adjusted Return, 1st Week Adjusted Return, 1st Month Adjusted Return,* of the IPO is defined as the percentage change of the stock price from its offering price to the first trading day, first trading week and first trading month's closing price with adjustments to the market index returns. *Market Return prior to IPO,* is calculated as the weighted average of the returns of the market index for the 3 months before the IPO pricing date. The weights are 3 for the most recent month, 2 for the next month and 1 for the third month before the IPO. *Market Volatility,* is the standard deviation of the 1 month return of the market index in the month before the IPO. In order to eliminate the inflation affect that may distort the results all figures are stated in USD.

4.2.1. Issue Related Characteristics
Source of Equity Sold, Days between pricing and first trade, Fractions of Equity Sold, IPO Amount and Underwriting Arrangements have been used as indicators of "issue related characteristics".

Source of Equity Sold, (Source_equity)
IPOs in the ISE are classified as either the offering of new issues where the equity that is offered to the public are from blocking of pre-emptive rights in a capital increase or the sales of previously issued outstanding shares where the equity that is offered to the public are from the existing shareholders. A dummy variable is employed and takes the value of 0 (zero) if the offering is the sale of the previously issued outstanding shares, and one (1) if it is the offering of new issues.

Fractions of Equity Sold, (Fra_ipo)
Portions of shares offered to the public.

IPO Amount, (Amount_ipo)
Gross proceeds from the IPO stated in USD. The natural logarithm of IPO amounts are used in the statistical tests.

Underwriting Arrangements, (Arrangement_type)
There are two types of underwriting arrangements in the ISE. The firm-commitment and the best-effort method. In the firm-commitment method, the underwriter guarantees the proceeds of the issuing firm and bears the risk of under subscription. In the best-effort offerings, the underwriter attempts to sell as many of the new shares as possible at an agreed price per share, without purchasing any shares.
A dummy variable is employed and takes the value of 0 (zero) if the offering is conducted through best-effort, and one (1) if the is the offering is conducted through firm commitment.

4.2.2. Issuing Firm Characteristics
Age of the Firm, Total Assets, Total Equity, Total Debt, Net Sales and Net Profit have been used as indicators of "issuing firm characteristics".

Age of the Firm, (Firm_age)
Is the age of the issuing firm at the time of the IPO. The natural logarithms of years are used in the statistical tests.

Total Assets, (Total_assets)
Is the book value of total assets of the firm in the year preceding of an IPO. In order to eliminate the inflation affect that may distort the results. All figures are stated in USD and the natural logarithms of amounts are used in the statistical tests.

Total Equity, (Total_equity)
Is the book value of total equity of the firm in the year preceding of an IPO. In order to eliminate the inflation affect that may distort the results. All figures are stated in USD and the natural logarithms of amounts are used in the statistical tests.

Total Debt, (Total_debt)
Is the book value of total debt of the firm in the year preceding of an IPO. In order to eliminate the inflation affect that may distort the results. All figures are stated in USD and the natural logarithms of amounts are used in the statistical tests.

Net Sales, (Net_sales)

Is the book value of net sales of the firm in the year preceding of an IPO. In order to eliminate the inflation affect that may distort the results. All figures are stated in USD and the natural logarithms of amounts are used in the statistical tests.

Net Profit, (Net_profit)
Is the book value of net profit of the firm in the year preceding of an IPO. In order to eliminate the inflation affect that may distort the results. All figures are stated in USD and the natural logarithms of amounts are used in the statistical tests.

4.2.3. Market Related Characteristics
Daily Return, Adjusted Daily Return, Weekly Return, Adjusted Weekly Return, Monthly Return, Adjusted Monthly Return, Standard Deviation, Market Return and Market Volatility have been used as indicators of "market related characteristics".

Daily Return, (Daily_ret)
Daily return of the IPO is defined as the percentage change of the stock price from its offering price to the first trading day closing price.

Adjusted Daily Return, (AdjDaily_ret)
Adjusted daily return of the IPO is defined as the percentage change of the stock price from its offering price to the first trading day closing price with adjustments to the market index returns[5].

Weekly Return, (Weekly_ret)
Weekly return of the IPO is defined as the percentage change of the stock price from its offering price to the first trading week closing price.

Adjusted Weekly Return, (AdjWeekly_ret)
Adjusted weekly return of the IPO is defined as the percentage change of the stock price from its offering price to the first trading week closing price with adjustments to the market index returns.

Monthly Return, (Monthly_ret)
Monthly return of the IPO is defined as the percentage change of the stock price from its offering price to the first trading month closing price.

Adjusted Monthly Return, (AdjMonthly_ret)
Adjusted monthly return of the IPO is defined as the percentage change of the stock price from its offering price to the first trading month closing price with adjustments to the market index returns.

Standard Deviation, (Std_dev)
The standard deviation of the daily returns of an IPO considering 30 trading days after the offer.

Market Return, (Mkt_Ret)
Market return is calculated as the weighted average of the returns of the market index for the 3 months before the IPO pricing date. The weights are 3 for the most recent month, 2 for the next month and 1 for the third month before the offering. Hsu and Hung's (2005) study in Taiwanese IPOs, shows that previous market returns prior to IPOs have significant impacts on the issuers' choice of IPO method.

Market Volatility, (Mkt_Vol)

---

[5]   The raw returns have been adjusted for market movements through deducting the corresponding return of the market index from the raw return on a
       given event day t.

Market volatility is the standard deviation of the 1 month return of the market index in the month before the IPO. Hsu and Hung's (2005) study in Taiwanese IPOs, shows that previous market volatility prior to IPOs have significant impacts on the issuers' choice of IPO method.

4.2.4. Probit Results

In this section, what we expect from binary probit is to help us relate issuers' choice of sale through stock exchange or fixed-price offer to "issue related characteristics" and/or "issuing firm characteristics" and/or "market related characteristics".

Table 3 shows the results of the probit analysis on "issue related characteristics", "issuing firm characteristics" and "market related characteristics". Model 1 of Table 3, relating "issue related characteristics" on the choice of IPO method shows that the coefficients of *Source_Equity* is positive and very significantly different from zero (p=0.0003), suggesting that IPOs using fixed price offers are from the new issues, where the proceeds from an IPO goes to the firm's growth opportunities. The coefficient *Amount_ipo* is positive and significantly different from zero (p=0.0365), suggesting that firms generating large amounts of proceeds from the IPO are more likely to adopt a fixed price offer. The last coefficient on issue related characteristics, *Arrangement_type,* is positive and very significantly different from zero (p=0.0024), suggesting that most of the fixed price offerings are conducted through firm commitment method.

Table 3: Probit analysis of the choice between Fixed Price Offer and Sale through the Stock Exchange

	Model 1 **Issue related characteristics**	Model 2 **Issuing firm characteristics**	Model 3 **Market related characteristics**	Model 4 **All variables**
Intercept	-5.4652 (0.0015)	-1.1343 (0.5482)	0.7652 (0.1834)	-0.9312 (0.8974)
Source_Equity	0.9484 **(0.0003)**			2.9213 **(0.0216)**
Fra_ipo	-0.0943 (0.8732)			-12.6222 **(0.0146)**
Amount_ipo	0.2035 **(0.0365)**			0.0019 (0.9954)
Arrangement_type	1.2384 **(0.0024)**			5.8801 **(0.0056)**
Firm_age		-0.1015 (0.4443)		-1.3607 **(0.0193)**
Total_assets		0.4602 (0.3570)		-1.7404 (0.0855)
Total_equity		0.4087 (0.2709)		1.1589 (0.0713)
Total_debt		-0.0501 (0.7877)		0.4969 (0.2358)
Net_sales		0.0682 (0.6484)		0.2530 (0.5692)
Net_profit		-0.8248 **(0.0026)**		-0.1529 (0.8402)
Daily_ret			2.1559 (0.6578)	-11.1361 (0.4763)
Adjdaily_ret			-1.7835 (0.7021)	15.9541 (0.3360)
Weekly_ret			-0.8641 (0.7233)	3.8172 (0.5643)
Adjweekly_ret			-0.3899 (0.8682)	-6.8622 (0.3177)
Monthly_ret			-1.4694 **(0.0338)**	-4.3189 **(0.0578)**
Adjmonthly_ret			-1.5506 **(0.0465)**	-3.8718 (0.0819)
Std_dev			-2.8477 (0.6587)	-13.7519 (0.5542)
Mkt_ret			0.5669 (0.6934)	4.6958 (0.4030)
Mkt_vol			3.9102 (0.1984)	2.4737 (0.6932)
McFadden R-squared	19.33%	13.30%	15.39%	64.44%

Source of Equity Sold, *(Source_Equity),* a dummy variable is employed and takes the value of 0 (zero) if the offering is the sale of the previously issued outstanding shares, and one (1) if it is the offering of new issues. *Fractions of Equity Sold, (Fra_ipo),* is the portions of shares offered to the public. *IPO Amount, (Amount_ipo),* is the gross proceeds from the IPO stated in USD. *Underwriting Arrangements, (Arrangement_type),* a dummy variable is employed and takes the value of 0 (zero) if the offering is conducted through best-effort, and one (1) if the is the offering is conducted through firm commitment. *Age of the Firm, (Firm_age),* is the age of the issuing firm at the time of the IPO. *Total Assets, (Total_assets), Total Equity, (Total_equity), Total Debt, (Total_debt), Net Sales, (Net_sales), Net Profit, (Net_profit),* are from the book values of the firm in the year preceding of an IPO. *Daily Return, (Daily_ret), Weekly Return, (Weekly_ret), Monthly Return, (Monthly_ret)* of the IPO is defined as the percentage change of the stock price from its offering price to the first trading day, first trading week and first trading month's closing price. *Adjusted Daily Return, (AdjDaily_ret), Adjusted Weekly Return (AdjWeekly_ret), Adjusted Monthly Return, (AdjMonthly_ret),* of the IPO is defined as the percentage change of the stock price from its offering price to the first trading day, first trading week and first trading month's closing price with adjustments to the market index returns. *Standard Deviation, (Std_dev),* is the standard deviation of the daily returns of an IPO considering 30 trading days after the offer. *Market Return, (Mkt_Ret),* is calculated as the weighted average of the returns of the market index for the 3 months before the IPO pricing date. The weights are 3 for the most recent month, 2 for the next month and 1 for the third month before the offering. *Market Volatility, (Mkt_Vol)* is the standard deviation of the 1 month return of the market index in the month before the IPO. In order to eliminate the inflation affect that may distort the results all figures are stated in USD and the natural logarithms of amounts and numbers are used in the statistical tests. P-values are reported under the coefficient estimates. Also reported is the McFadden R-squared.

Model 2 of Table 3, relating "issuing firm characteristics" on the choice of IPO method shows that only the coefficient of *Net_profit* is negative and significantly different from zero (p=0.0026), suggesting that firms earning larger profits tend to use sale through the stock exchange method when offering their shares to the public.

Model 3 of Table 3, relating "market related characteristics" on the choice of IPO method shows that only the coefficients of *Monthly_ret* and *Adjmonthly_ret* are negative and significantly different from zero (p<0.05), suggesting that firms expecting to generate an upward short term performance on their offering will more likely use sale through the stock exchange method. However, contrary to Hsu and Hung's (2005) study, which shows that previous market returns and volatility prior to IPOs have significant impacts on the issuers' choice of IPO method, *Market Return* and *Market Volatility* variables on Turkish IPOs do not have any significant impacts on the choice of an IPO method.

Model 4 of Table 3, combines "issue related characteristics", "issuing firm characteristics" and "market related characteristics" into a single column. For the issue related characteristics, the results are similar on *Source_Equity* and *Arrangement_type* variables. However, *Amount_ipo* variable which was significant in Model 1 became insignificant. The last variable listed on the fourth row of the "issue related characteristics", *Fra_ipo*, becomes significantly different from zero (p=0.0146), suggesting that issuers offering larger portions of their shares to the public use the sale through the stock exchange method. For the "issuing firm characteristics", only the *Firm_age* variable becomes significantly different from zero (p=0.0193), negative coefficient suggests that older firms use the sale through the stock exchange method when offering their shares to the public. For the market related characteristics *Adjmonthly_ret* becomes insignificant and *Monthly_ret* remains marginally significantly different from zero (p=0.0554).

We assessed the robustness of the estimation results by dropping up to 14 variables from the model to assess the stability of coefficient estimates. First, we dropped 4 variables (*Total Assets, Total Equity, Total Debt and Net Sales*) from the model where the Pearson correlation coefficients had values greater than .20, than one variable at a time and in combination, however, dropping these variables from the model yielded similar results but lower McFadden R-squared values for the remaining variables.

Our results on issuers' choice of IPO method demonstrate that the variables of "issue related characteristics" have strong influence on the choice between fixed price offer and sale through the stock exchange method. Model 1, relating "issue related characteristics" to issuers' choice of IPO method, has a McFadden R-squared of 19.33%. Model 2, relating "issuing firm characteristics" to issuers' choice of IPO method, has a McFadden R-squared of 13.30%. Model 3, relating "market related characteristics" to issuers' choice of IPO method, has a McFadden R-squared of 15.39%. Model 4, relating all variables to issuers' choice of IPO method, has a McFadden R-squared of 64.44%, which is significantly higher than Hsu and Hung's (2005) Pseudo R-squared of 18.00%.

5.   Underpricing of IPOs in Fixed-Price Offer and Sale through the Stock Exchange Methods

5.1. First Day Underpricing

Following the probit analysis, the second stage aims to determine the factors that are expected to have an effect on the IPO returns. In order to test the effects of different characteristics on the underpricing level, we identified the "issue related characteristics", "issuing firm characteristics" and "market related characteristics" as dependent variables. From the univariate results in Panel B of Table 2, we expect the underpricing to be lower in IPOs with fixed price offers. Therefore, the *Adjusted Daily Return* values have been regressed against these variables.

Table 4 shows the underpricing levels, by "issue related characteristics" in Regression 1, "issuing firm characteristics" in Regression 2, and "market related characteristics" in Regression 3.

Regression 4, combines these characteristics into a single column. Regression 1 and 4 of Table 4 shows that the coefficient of *Fixed Price Offer* is negatively related to *Adjusted Daily Return* indicating that the average underpricing is lower in fixed price offers than sale through the stock exchange method, but the difference is not significantly different from zero (p=0.4747).

Table 4:   Results of multiple regression analysis – First Day Underpricing

	Regression 1	**Regression 2**	**Regression 3**	**Regression 4**
	Issue related characteristics	**Issuing firm characteristics**	**Market related characteristics**	**All variables**
Intercept	0.2347 (0.1742)	0.0363 (0.9153)	0.0384 (0.4250)	0.2435 (0.3665)
Ipo_Method (Fixed Price Offer)	-0.0653 (0.1328)			-0.0481 (0.4747)
Source_equity	-0.0117 (0.6862)			-0.0597 (0.0604)
Fra_ipo	0.0503 (0.5284)			0.0605 (0.7302)
Amount_ipo	0.0087 (0.3949)			0.0038 (0.7282)
Arrangement_type	-0.0768 (0.2760)			-0.0796 (0.4837)
Firm_age		0.0110 (0.3640)		0.0221 (0.1689)
Total_assets		-0.0177 (0.6461)		-0.0260 (0.6338)
Total_equity		-0.0084 (0.7639)		0.0055 (0.9002)
Total_debt		0.0193 (0.1765)		0.0336 **(0.0553)**
Net_sales		0.0155 (0.5437)		0.0248 (0.2662)
Net_profit		-0.0068 (0.7378)		-0.0470 (0.0981)
Mkt_ret			0.4292 **(0.0001)**	0.6166 **(0.0000)**
Mkt_vol			0.1523 (0.5739)	0.0148 (0.9712)
Adj. R-squared	7.15%	5.00%	8.50%	17.20%

Ipo_Method (Fixed Price Offer), a dummy variable is employed and takes the value of 0 (zero) if the offering is a sale through the stock exchange method, and one (1) if it is the offering is a fixed price offer, *Source of Equity Sold, (Source_equity),* a dummy variable is employed and takes the value of 0 (zero) if the offering is the sale of the previously issued outstanding shares, and one (1) if it is the offering of new issues. *Fractions of Equity Sold, (Fra_ipo),* is the portions of shares offered to the public. *IPO Amount, (Amount_ipo),* is the gross proceeds from the IPO stated in USD. *Underwriting Arrangements, (Arrangement_type),* a dummy variable is employed and takes the value of 0 (zero) if the offering is conducted through best-effort, and one (1) if the is the offering is conducted through firm commitment. *Age of the Firm, (Firm_age),* is the age of the issuing firm at the time of the IPO. *Total Assets, (Total_assets), Total Equity, (Total_equity), Total Debt, (Total_debt), Net Sales, (Net_sales), Net Profit, (Net_profit),* are from the book values of the firm in the year preceding of an IPO. *Market Return, (Mkt_Ret),* is calculated as the weighted average of the returns of the market index for the 3 months before the IPO pricing date. The weights are 3 for the most recent month, 2 for the next month and 1 for the third month before the offering. *Market Volatility, (Mkt_Vol)* is the standard deviation of the 1 month return of the market index in the month before the IPO. All tests are conducted under α= %1 significance level. P-values are reported under the coefficient estimates. Also reported is the Adjusted R-squared.

The *Total Debt* variable under the "issuing firm characteristics" is marginally significantly different from zero (p=0.055), a positive coefficient indicates that underpricing is higher on firms with larger debts.

The only variable that is significantly different from zero in these regressions, is the *Market Return* (p=0.0000). As pointed out by Derrien and Womack (2003), Hsu and Hung (2005), market return and market volatility prior to the IPO date can predict underpricing and the variance of underpricing. Derrien and Womack (2003), have shown that market return, a proxy for the overall market's price momentum in the 3 months prior to an offering, is a significant ex ante predictor of the

level of underpricing in French IPOs. Consistent with their findings on French and Taiwanese IPOs, the *Market Return* variable in Turkish IPOs has a significant impact on the underpricing of the issues.

5.2. Short-run Market Performance of IPOs

As the price of the shares moves within the band determined by the daily limits (+/- 21 %) set by the ISE. We believe that the daily price limits imposed on the securities traded in the ISE could affect the level of first day underpricing results. We extended the first day underpricing calculations to the first week and first month returns.

We first carry out the results of Regression 4 of Table 4, to the Regression 1 of Table 5 for comparison purposes. Than in Regression 2 of Table 5, we regressed the *Adjusted Weekly Return* values against the variables of "issue related characteristics", "issuing firm characteristics" and "market related characteristics". Results of the analyses show that, coefficient of *Fixed Price Offer* is negatively related to *Adjusted Weekly Returns* indicating that the average underpricing is lower in fixed price offers than sale through the stock exchange method, and contrary to the *Adjusted Daily Return* results listed in Regression 1, the difference becomes significantly different from zero (p=0.0196). *Total_debt* variable, which is marginally significantly different from zero in Regression 1 becomes significantly different from zero, a positive coefficient still indicates underpricing is higher on firms with larger debts. As discussed in the previous section, *Mkt_ret* is still significantly different from zero. The last variable which is marginally significantly different from zero (p=0.0518) is the *Net_profit* variable.

Table 5: Results of multiple regression analysis – Short-run Market Performance of IPOs

	Regression 1	**Regression 2**	**Regression 3**
	Adjusted Daily Return	**Adjusted Weekly Return**	**Adjusted Monthly Return**
Intercept	0.2435 (0.3665)	1.1980 (0.0539)	1.6919 (0.1606)
Ipo_Method (Fixed Price Offer)	-0.0481 (0.4747)	-0.2720 **(0.0196)**	-0.3661 **(0.0540)**
Source_equity	-0.0597 (0.0604)	-0.0009 (0.9891)	-0.0462 (0.7153)
Fra_ipo	0.0605 (0.7302)	-0.5273 (0.1335)	-0.8239 (0.1686)
Amount_ipo	0.0038 (0.7282)	-0.0208 (0.4380)	-0.0805 (0.1341)
Arrangement_type	-0.0796 (0.4837)	0.1229 (0.5163)	0.0814 (0.8302)
Firm_age	0.0221 (0.1689)	-0.0088 (0.7806)	-0.0029 (0.9579)
Total_assets	-0.0260 (0.6338)	-0.2251 (0.0673)	-0.3399 (0.0699)
Total_equity	0.0055 (0.9002)	0.1209 (0.2774)	0.3243 (0.0636)
Total_debt	0.0336 **(0.0553)**	0.1294 **(0.0003)**	0.1712 **(0.0033)**
Net_sales	0.0248 (0.2662)	0.0299 (0.5052)	0.0439 (0.4955)
Net_profit	-0.0470 (0.0981)	-0.1054 **(0.0518)**	-0.2392 **(0.0274)**
Mkt_ret	0.6166 **(0.0000)**	1.1373 **(0.0015)**	2.1009 **(0.0039)**
Mkt_vol	0.0148 (0.9712)	0.7178 (0.3923)	2.6311 (0.0967)
Adj. R-squared	17.20%	17.95%	18.98%

Ipo_Method (Fixed Price Offer), a dummy variable is employed and takes the value of 0 (zero) if the offering is a sale through the stock exchange method, and one (1) if it is the offering is a fixed price offer, *Source of Equity Sold, (Source_equity)*, a dummy variable is employed and takes the value of 0 (zero) if the offering is the sale of the previously issued outstanding shares, and one (1) if it is the offering of new issues. *Fractions of Equity Sold, (Fra_ipo)*, is the portions of shares offered to the public. *IPO Amount, (Amount_ipo)*, is the gross proceeds from the IPO stated in USD. *Underwriting Arrangements, (Arrangement_type)*, a dummy variable is employed and takes the value of 0 (zero) if the offering is conducted through best-effort, and one (1) if the is the offering is conducted through firm commitment. *Age of the Firm, (Firm_age)*, is the age of the issuing firm at the time of the IPO. *Total Assets, (Total_assets), Total Equity, (Total_equity), Total Debt, (Total_debt), Net Sales, (Net_sales), Net Profit, (Net_profit)*, are from the book values of the firm in the year preceding of an IPO. *Market Return, (Mkt_Ret)*, is calculated as the weighted average of the returns of the market index for the 3 months before the IPO pricing date. The weights are 3 for the most recent month, 2 for the next month and 1 for the third month before the offering. *Market Volatility, (Mkt_Vol)* is the standard deviation of the 1 month return of the market index in the month before the IPO. All tests are conducted under $\alpha = \%1$ significance level. P-values are reported under the coefficient estimates. Also reported is the Adjusted R-squared.

In Regression 3 of Table 5, we regressed the *Adjusted Monthly Return* values against the variables of "issue related characteristics", "issuing firm characteristics" and "market related characteristics". Results of the analyses show that, coefficient of *Fixed Price Offer* is still negatively related to *Adjusted Returns* indicating that the average underpricing is lower in fixed price offers than sale through the stock exchange method, and contrary to the *Adjusted Daily Return* results listed in Regression 1, the difference becomes marginally significantly different from zero (p=0.0540). *Total_debt* variable, which is marginally significantly different from zero in Regression 1, becomes significantly different from zero. As discussed in the previous section, *Mkt_ret* is still significantly different from zero. The last variable, *Net_profit,* which was marginallly significantly different from zero in Regression 2, becomes significantly different from zero in Regression 3.

6. Conclusion

Recent empirical studies on Turkish IPOs conducted by Ozer (1999), Kiymaz (2000) and Durukan (2002) show that underwriters of the Turkish companies listed in the Istanbul Stock Exchange do not fully incorporate all available information into the IPO offer price. The first day returns of IPOs average approximately 12.41%-13.10%-14.61% respectively, indicating that systematic underpricing largely observed in the ISE. In line with the evidence on these recent empirical findings, Turkish IPOs in our study also suffer from a significant underpricing on an average. The average initial returns computed on the basis of first trading day closing are positive and significant for all the three types of IPO methods, high levels of underpricing observed in sale through the stock exchange with a mean of 15.68%, in book building with a mean of 11.47% and low levels of underpricing observed in fixed price offers with a mean of 7.01%. It is also found that issues offered to the public by sale through the stock exchange not only provide significantly higher first-day return, but also yield higher short-run performance up to a month after the first day of trading. Investors who buy these issues at market close on the first day of the trading date and hold them for one month can earn more than 25 percent on their initial investment.

The efficiency of the IPO methods has been the subject of an academic research over a decade, both empirical studies and theoretical models have tried to explain the advantages of one method over another. The argument that is often made in favor of IPO methods is often empirical as well as theoretical. Researchers studying on the efficiency of the IPO methods try to answer the most challenging question, "Which one of the IPO mechanism is the most efficient?".

Our results on issuers' choice of IPO method demonstrate that the variables of *Source of Equity Sold, IPO Amount, Underwriting Arrangements* under "issue related characteristics", *Net profit* under "issuing firm characteristics", *Monthly Return, Adjusted Monthly Return* under "market related characteristics" have strong influence on the choice between fixed price offer and sale through the stock exchange method. However, contrary to Hsu and Hung's (2005) study, which shows that previous market returns and volatility prior to IPOs have significant impacts on the issuers' choice of IPO method, *Market Return* and *Market Volatility* variables on Turkish IPOs do not have any significant impacts on the choice of an IPO method.

Following the results on issuers' choice of IPO method between fixed price offer and sale through the stock exchange method, we next determine the factors that are expected to have an effect on the IPO returns. *Market Return* variable under the "market related characteristics" has a significant impact on the underpricing of the issues. As pointed out by Derrien and Womack (2003), Hsu and Hung (2005), market return and market volatility prior to the IPO date can predict underpricing and the variance of underpricing. Derrien and Womack (2003), have shown that market return, a proxy for the overall market's price momentum in the 3 months prior to an offering, is a significant ex ante predictor of the level of underpricing in French IPOs. Consistent with their findings on French and Taiwanese IPOs, market returns prior to IPOs confirm that firms prefer to go public in "hot markets" and the *Market Return* variable, calculated as the weighted average of the returns of the market index for the 3 months before the IPO pricing date, in Turkish IPOs has a significant impact on the underpricing of the issues.

The literature on the efficiency of the IPO methods suggests that, fixed price offering seems to be the less favorable method comparing to book building and auction methods across many countries around the world. However, as stated by Sherman (2002), stock markets listing few IPOs each year, i.e. Istanbul Stock Exchange, fixed price offering is still be the optimal method. At last, our results indicate that the comparison of the two mechanisms yield that for certain values, namely *first day underpricing, IPO amount and fractions of equity sold*, fixed price method outperforms the sale through the stock exchange method.

Acknowledgement

References

[1]   Allen, F., and G. Fauhaber, 1989, "Signaling by Underpricing In the IPO Market," Journal of Financial Economics, 23, pp.303-323.

[2]   Anand, A.I., 2005, "Is the Dutch Auction IPO a Good Idea?", Expresso Preprint Series, Paper, 672.

[3]   Aorsio, R., G. Giudici, and S., Paleari., 2000, "Underpricing and Money "Left on the Table" in Italian IPOs", Working Paper, Politecnico di Milano - Dipartimento di Economia e Produzione

[4]   Beierlein, J., 2000, "The Efficiency of IPO Mechanisms: A Comparison of Book-Building", Discriminatory Price Auctions and Uniform Price Auctions, Unpublished paper, University of Utah.

[5]   Bennouri, M. and S. Falconieri, 2001, "Price vs. Quantity Discrimination in Optimal IPOs", Tinbergen Institute Discussion Papers.

[6]   Benveniste, L, and P. Spindt, 1988, "Bringing New Issues to Market: A Theory of Underwriting." Unpublished Manuscript.

[7]   Benveniste, L., and P. Spindt, 1989, "How investment bankers determine the offer price and allocation of new issues", Journal of Financial Economics, 24, pp.343-361.

[8]   Benveniste, L., and W. Busaba, 1997 "Bookbuilding versus Fixed Price: An Analysis of Competing Strategies for Marketing IPOs", Journal of Financial and Quantitative Analysis, 32, pp.383-403.

[9]   Biais, B., P. Bossaert, and J.C. Rochet, 2002, "An optimal IPO mechanism", Review of Economic Studies, 69, pp.117-146.

[10]   Biais, B., and A.M. Faugeron-Crouzet, 2002, "IPO Auctions: English, Dutch,…French and Internet", Journal of Financial Intermediation , 11, pp.9-36.

[11]   Bierbaum, J., and V. Grimm, 2003, "Selling Shares to Retail Investors: Auction vs. Fixed Price", Humboldt-Universitat Berlin, Working Paper.

[12]   Chalk A.J., and J.W. Peavy, 1987, Initial public offerings and underwriter reputation", Journal of Finance, Vol. 45, No. 4, pp. 1045-1067.

[13]   Chahine, S., 2002, "Mispricing in IPO Methods and the Predictive Ability of Investors' Interest for New Issues", University of Audencia-Nantes, Working Paper.

[14]   Chemmanur, T., and H. M. Liu, 2003, "How should a firm go public? A dynamic model of the choice between fixed-price offerings and auctions in IPOs and privatizations", Unpublished paper, Boston College.

[15]   Chowdhry, B., and A. Sherman, 1996, "International differences in oversubscription and underpricing of IPOs", Journal of Corporate Finance, Vol. 2, Issue 4, pp.359-381.

[16]   Cornelli, F., and D. Goldreich, 2001, "Book Building and Strategic Allocation", Journal of Finance, Vol. 56, Number 6, pp.2337-2369.

[17]   Cornelli, F., and D. Goldreich, 2003, "Bookbuilding: How Informative Is the Order Book", Journal of Finance, Vol. 58, Number 4, pp.1415-1443.

[18]   Derrien, F. and K. Womack, 2003, "Auction vs Bookbuilding and the Control for Underpricing in the Hot IPO Markets", Review of Financial Studies, Vol. 16, Number 1, pp.31-61.

[19]   Draho, J., 2001, "The Effect of Uncertainty on the Underpricing of IPOs", mimeo, Yale University.

[20]   Durukan, M.B., 2002, "The relationship between IPO returns and factors influencing IPO performance: case of the Istanbul Stock Exchange", Managerial Finance, Vol. 28, pp.18-38.

[21]   Degeorge, F., Derrien, F., and K.L. Womack, 2005, "Quid Pro Quo in IPOs: Why Book-Building Is Dominating Auctions, RICAFE Working Paper, No. 011

[22]   Guidici, G., and S. Paleari., 2001, "What drives the initial market performance of Italian IPOS? An empirical investigation on underpricing and price support", Working Paper, Universita degli Studi di Bergamo, Italy.

[23]   Grinblatt, M., and C. Hwang, 1989, "Signalling and the Pricing of New Issues," Journal of Finance, 44, pp.393-420.

[24]   Hsu, Y., and H. Chung-Wen, 2005, "Why Have IPO Auctions Lost Market Share to Fixed-price Offers? Evidence from Taiwan" Working Paper, National Chengchi University, Taipei, Taiwan, Southern Taiwan University of Technology, Tainan, Taiwan.

[25]   Ibbotson, R., 1975, "Price performance of common stock new issues", Journal of Financial Economics, September, pp.235-272.

[26]   Jagannathan, R., and A. Sherman, 2005, "Reforming the Bookbuilding Process for IPOs", Journal of Applied Corporate Finance, Vol. 17, Number 1, pp.67-72

[27]   Jenkinson, T., and H. Jones, 2004, "Bids and Allocations in European IPO Bookbuilding", Journal of Finance, 59, 5, pp.2309-2338.

[28]   Kandel, S., Sarig O., and A. Wohl, 1999, "The Demand for Stocks: An Analysis of IPO Auctions", The Review of Financial Studies, 12, pp.227-48.

[29]   Kaneko, T. and R. H. Pettway, 2003, "Auctions versus book building of Japanese IPOs", Pacific-Basin Finance Journal, 11, (September), pp.439-462.

[30]   Kiymaz, H., 2000, "The initial and aftermarket performance of IPOs in an emerging market: evidence from Istanbul Stock Exchange", Journal of Multinational Financial Management, Vol. 10, pp.213-227.

[31]   Kutsuna, K., and R. Smith, 2004, "Issue cost and method of IPO under-pricing: Japan's change from auction method pricing to book-building", The Review of Financial Studies, 17, 4, pp.1129-1166.

[32]   Liu, Y., J. Wei, and G. Liaw, 2003, "On the demand elasticity of initial public offerings: An analysis of discriminatory auctions", International Review of Finance, 2, pp.151-178.

[33]   Ljungqvist, A.P., 2005, "IPO Underpricing", Forthcoming in B. Espen Eckbo (ed.), Handbook of Corporate Finance: Empirical Corporate Finance (*Handbooks in Finance Series,* Elsevier/North Holland), Chapter 12.

[34]   Ljungqvist, A.P., Jenkinson, T., Wilhelm, W.J., 2000, "Has the introduction of bookbuilding increased the efficiency of international IPOs?" Working Paper, Stern School of Business,New York University.

[35]   Logue, D., 1973, "On the pricing of unseasoned equity issues:1965-1969", Journal of Financial and Quantitative Analysis, January, pp.91-103.

[36]   Loughran, T., Ritter, J.R., and K. Rydqvist, 1994, "Initial public offerings: international insights", Pacific-Basin Journal, Vol. 2, pp.165-199.

[37]   McDonald, S., 2001, "Internet IPO Auctions: Will they eliminate traditional underwriting inefficiencies?"University of Lausanne, Masters Thesis.

[38]   Miller, R., and F. Reilly, 1987, "An Examination of Mispricing, Returns and Uncertainty of IPOs", Financial Management, Summer, pp.33-38.

[39]   Ozer, B., 1999, "Price Performance of Initial Public Offerings in Turkey", Capital Markets Board of Turkey, Publication No. 128, Ankara, Turkey.

[40]   Pettway, R. H., and T. Kaneko, 1996, "The effects of removing price limits and introducing auctions upon short-term IPO returns: The case of Japanese IPOs", Pacific-Basin Finance Journal, 4, pp.241-258.

[41]   Ritter, J.R., 1984, "The 'Hot Issue' Market of 1980," Journal of Business 57, pp.215-240.

[42]   Ritter, J.R., 1998, "Initial Public Offerings", Contemporary Finance Digest 2, pp.5-30.

[43]   Ritter, J.R., and I. Welch, 2002, "A Review of IPO Activity, Pricing, and Allocations", Yale ICF Working Paper No. 02-01.

[44]   Ritter, J.R., 2003, "Differences between European and American IPO Markets", European Financial Management, Vol. 9, Number 4, pp.421-434.

[45]   Rock, K., 1986, "Why New Issues Are Underpriced," Journal of Financial Econometrica 15, pp.187-212.

[46]   Sherman, A., 2000, "IPOs and Long Term Relationships: An Advantage of Book Building", Review of Financial Studies 13, pp.697-714.

[47]   Sherman, A., 2002, "Global Trends in IPO Methods: Book Building vs. Auctions", Working Paper, University of Notre Dame.

[48]   Spatt, C., and S. Srivastava, 1991, "Preplay Communication, Participation Restrictions, and Effciency in Initial Public Offerings", Review of Financial Studies, 4, pp.709-726.

[49]   Vandemaele, S., 2003, "Choice of selling mechanism at the IPO: the case of the French Second Market", European Financial Management, 9, 4, pp.435-455.

[50]   Welch, I., 1989; "Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings," Journal of Finance, 44, pp.421-449.

[51]   Welch, I., 1992, "Sequential Sales, Learning, and Cascades", Journal of Finance, 47, pp.695-732.